6 Summary of Environmental Consequences

SUMMARY OF ALL ALTERNATIVES

This chapter synthesizes the detailed information provided in Chapter 5 and provides summary information "at- a- glance." Table 6- 1 rates the environmental consequences (or impacts) of each fire and fuels management alternative for each issue and assessment factor. Table 6- 2 provides a narrative summary of each alternative.

Table 6-1 – Summary of environmental consequences of alternatives for each issue detailed in Chapter 5.

Issue and Assessment Factor	Alt. 1 No Action (Current Program)	Alt. 2 Prescribed Fire	Alt. 3 Wildland Fire Use	Alt. 4 Multi-Strategy (Preferred Alternative)
Vegetation				
• Maintenance of Natural Fire Regimes	0	+	+	++
• Acres Restored	0	++	+	++
• Risk of Catastrophic Loss	0	+	-	+
Wildlife				
• Maintenance of Natural Conditions and Habitat Diversity	0	+	+	++
• Acres Restored	0	+	+	+
• Risk of Catastrophic Habitat Loss	0	++	+	++
Special Status Species				
• Potential for Take of Individuals Protected as Threatened or Endangered	0	0	0	0
• Loss of Viable Protected Populations	0	0	0	0
• Loss of Critical Habitat Defined in Recovery Plans	0	0	0	0
• Amount of Habitat Restored or Maintained	0	+	+	+
• Reduced Risk of Catastrophic Loss	0	++	+	++
Prevent Spread of Non-Native/Invasive Species				
• Area Treated	0	0	0	0
• Area Exposed to High Severity Fire	0	0	0	0
Air				

Issue and Assessment Factor	Alt. 1 No Action (Current Program)	Alt. 2 Prescribed Fire	Alt. 3 Wildland Fire Use	Alt. 4 Multi-Strategy (Preferred Alternative)
• Conformity to Existing Law	0	0	0	0
• Conformity with Local and State Implementation Plans	0	0	0	0
• Extent to Which Alternatives Minimize Air Quality Effects while Achieving Park Goals	0	+	+	+
Water				
• Actions Conform to Intent of Clean Water Act	0	+	+	+
• Actions Conform to Executive Orders 11988 and 11990	0	0	0	0
• Alternatives Improve Resource Condition	0	+	+	+
Soil				
• Maintenance of Natural Processes	0	++	+	++
• Acres Pro-actively Managed	0	+	+	++
• Risk of Catastrophic Loss	0	++	+	+
Health/Safety				
• Minimize Direct Exposure to Hazardous Environment	0	++	0	+
• Minimize Exposure to Secondary Effects of Fire	0	++	-	+
Community Economics				
• Fire Management Payroll	$1 million	$1.2 million	$1.2 million	$1.5 million
• Program Support	$280 thousand	$300 thousand	$300 thousand	$320 thousand
• Tourism Impacts	0	- / 0	--	- / 0
Minimize Program Cost				
• Relative Cost of Alternatives for first 10 years	$2.5 million	$3.9 million	$7.3 million	$5.2 million
• Relative Cost of Alternatives for 25 years	$2.9 million	$3.1 million	$6.2 million	$5.1 million
• Achieve Management Objectives	0	0	0	++
Wilderness				
• Minimum Requirement	0	0	+	+
• Minimum Tool	0	0	0	0

Issue and Assessment Factor	Alt. 1 No Action (Current Program)	Alt. 2 Prescribed Fire	Alt. 3 Wildland Fire Use	Alt. 4 Multi-Strategy (Preferred Alternative)
• Wilderness Character	0	0	+	+
Wild and Scenic Rivers • Impact on Outstanding Resource Values	0	+	0	+
Recreation • Provide High Quality Visitor Experience • Minimize Interruption of Recreational Pursuits	0 0	- / + -	0 --	- / + 0
Cultural/Historic • Minimize Surface Disturbance • Allow Pre-Planning and Mitigation • Reduce the Risk of Damage from High Severity Fire Events	0 0 0	- ++ +	+ -- 0	0 0 +
Reduce Risk Of Catastrophic Events • Minimize the risk of large-scale high severity fire	0	++	- / +	+
Environmental Justice • Disproportionate Effect	0	0	0	0
Indian Trust Resources • Impacts to Indian Trust Resources	0	0	0	0

Alternatives 2, 3, and 4 are rated in relation to Alternative 1, which is the baseline for comparison and is always zero (0). The scale for Alternatives 2, 3, and 4 is:

++ effects are highly desirable compared to Alternative 1 (No Action)
+ effects are desirable compared to the effects of Alternative 1 (No Action)
0 effects are equal to the effects of Alternative 1 (No Action)
- effects are undesirable compared to the effects of Alternative 1 (No Action)
-- effects are highly undesirable compared to the effects of Alternative 1 (No Action)

Table 6-2 – Narrative Summary of environmental consequences of alternatives

Alternative 1 No Action (Current Program)	Alternative 2 Prescribed Fire	Alternative 3 Wildland Fire Use	Alternative 4 Multi-Strategy (Preferred Alternative)
Summary of Consequences Continuation of the current program and its level of accomplishment would achieve localized resource and hazard fuel	**Summary of Consequences** Most hazard fuel and some resource restoration objectives may be met with this strategy. Sequoia	**Summary of Consequences** Many areas of the park currently in a natural state and having normal fuel loads would benefit from the natural fire	**Summary of Consequences** This alternative would most fully achieve hazard fuel reduction and resource management objectives of restoring

Alternative 1 No Action (Current Program)	Alternative 2 Prescribed Fire	Alternative 3 Wildland Fire Use	Alternative 4 Multi-Strategy (Preferred Alternative)
objectives but result in continued degradation of the natural resource overall. An analysis of past program accomplishments has shown that the actions taken to date have been significant at reducing hazard fuel conditions at the local level and to approximately 50% of giant sequoia grove acres. However, the current level of fire activity has not been adequate to effectively restore and maintain desired resource conditions throughout much of the park. Under this alternative many resource areas within the parks would continue to decline in condition due to the lack of fire and the subsequent increase in fuel loading. Sequoia reproduction in untreated groves would continue to decline.	reproduction in some treated groves would increase. This alternative would intercept natural fire events, relying on well-planned management ignitions to simulate natural events and their effects. The strategy would allow the maximum amount of control over the timing and location of fire (and hence smoke) events by suppressing all random ignitions (lightning and human caused). Since this strategy would depend fully on management actions to simulate natural processes throughout the park, more scientific and monitoring information would be required to model and understand the timing, placement, and outcomes of the ignitions. Additional staff would be required to plan, implement, and monitor the increased number of planned ignitions. Loss of wilderness character may result from the intensive fire management activity needed to implement extensive prescribed fire projects. Replacing the natural fire regime with a simulated regime may result in unnatural ecological outcomes.	events. Because of developments in various areas of the park that require protection from fire, and the random nature of natural fire events through space and time, this strategy may result in areas that would never be fully restored or managed for natural function within a conceivable time frame. Areas where unnaturally high fuel loads exist may experience more severe fire effects, including high tree mortality. Since unnatural fuels would not have been reduced through conservative prescribed burning or mechanical means, unwanted fire effects may be extensive should a natural fire event occur under severe weather or extremely dry fuel conditions.	natural ecosystem process and function and provide for human safety. Giant sequoia reproduction throughout its range in the parks would increase to natural levels. An appropriate mix of natural fire, prescribed fire and mechanical fuel treatments would be used in concert with fire suppression to restore and maintain landscapes within the parks.

Alternative 1 No Action (Current Program)	Alternative 2 Prescribed Fire	Alternative 3 Wildland Fire Use	Alternative 4 Multi-Strategy (Preferred Alternative)
Vegetation Under the current program, the vegetation in some areas of the parks' would receive beneficial effects of fire treatment. At the current rate much of the parks' vegetation would burn too infrequently to mimic historic fire return intervals. The long-term consequences of this change in fire regime would further degrade the vegetation conditions throughout the parks. Adverse impacts would include an increase in fire-intolerant species, combined with a lack of regeneration of many fire-adapted species, resulting in further unnatural changes in vegetation structure, composition, and function. In addition to these changes, continued accumulation of fuels would lead to unwanted wildland fires with uncharacteristically severe fire effects, leading to increased mortality and inhibited postburn regeneration.	**Vegetation** A large increase in prescribed fire would beneficially affect the parks' fire-maintained vegetation by restoring fire-related ecological benefits. In areas where heavy fuel loads have resulted from fire exclusion, prescribed fire would be used to reduce fuel loads to more natural levels to help prevent severe effects of unwanted wildland fire. However, with increased use of prescribed fire, the natural ignition and spread pattern of fire on the landscape would be replaced by less random ignition patterns, creating a less natural pattern of fire effects compared with wildland fire use. The long-term consequences of less natural fire patterns are unknown.	**Vegetation** Due to the increase in acres treated with wildland fire use in this alternative, more of the parks' vegetation would burn with a more natural pattern of fire effects compared with Alternative 1. Fire effects would be beneficial to the structure and function of much of the parks' vegetation which has evolved with fire over time. In many areas between approximately 4000-8000 feet (1200-2400 meters) in elevation, where heavy fuel loads have resulted from fire exclusion and prescribed fire was not used to first restore fuel loads in the area, uncharacteristically severe fire effects could occur. In these cases, the adverse impacts on vegetation would include unnaturally high levels of mortality and disruption of plant succession, with slower postburn regeneration of species adapted to less severe fire effects.	**Vegetation** An increase in both prescribed fire and fire use would have a beneficial effect on the parks' vegetation by restoring the structure and function of historically fire-maintained vegetation over a larger area of the parks compared to Alternative 1. Fire-related ecological benefits would occur in a larger portion of the parks. More natural patterns of fire effects on vegetation would occur with an increase in wildland fire use. In vegetation types that have been greatly altered by fire exclusion, fire would be reintroduced initially with prescribed fire to first restore fuel and vegetation conditions to minimize adverse effects of severe fire. Wildland fire use would then be used to the extent possible to maximize the benefits of natural fire patterns.

Alternative 1 No Action (Current Program)	Alternative 2 Prescribed Fire	Alternative 3 Wildland Fire Use	Alternative 4 Multi-Strategy (Preferred Alternative)
Wildlife Under the current program, fire treatments would be less frequent than historic fire-return intervals. Without sufficient fire, the vegetation would continue to become more homogeneous resulting in wildlife habitat that is less varied. Wildlife would be adversely affected by the loss of some types of habitat that was maintained by historic fire regimes. In addition, the risk of uncharacteristically severe wildland fire would become greater over time, and would have the potential to threaten wildlife populations not adapted to more severe fire effects.	**Wildlife** The use of prescribed fire in a larger portion of the parks' would be restored than under Alternative 1. This would create more varied vegetation patterns across the landscape and a greater variety of wildlife habitat. More habitat conditions favorable to fire-adapted species would be created, but not necessarily in the same patterns associated with natural ignitions. The distribution of habitat would be determined by prescribed burn timing, locations, conditions, and pattern and could result in less natural habitat conditions compared to wildland fire use. The long-term consequences of less natural fire patterns and corresponding habitat conditions are unknown.	**Wildlife** With an increase in wildland fire use under this alternative a more natural distribution of habitat conditions would occur over a larger area than in Alternative 1. Many wildlife species would benefit. In areas where heavy fuel loads have resulted from fire exclusion, unnaturally severe fire effects could occur that might negatively impact wildlife species locally, but would increase the landscape heterogeneity, thereby improving wildlife biodiversity at the landscape scale.	**Wildlife** An increase in areas restored using fire in this alternative would maintain a more natural distribution of wildlife habitat than in Alternative 1. A greater use of wildland fire use in Alternative 4 would increase landscape heterogeneity and improve wildlife biodiversity at the landscape scale. In areas where heavy fuel loads have resulted from past fire exclusion, prescribed fire would first be used to reduce the risk of uncharacteristically severe fire and corresponding radical changes to the habitat.
Special Status Species Common to All: With the exception of the Valley elderberry longhorn beetle, no federally listed plant or animal species would be affected as a result of fire restoration.			

Alternative 1 No Action (Current Program)	Alternative 2 Prescribed Fire	Alternative 3 Wildland Fire Use	Alternative 4 Multi-Strategy (Preferred Alternative)
Special Status Species Under Alternative 1, fire restoration would occur in limited areas of the parks and would have no effect or potentially beneficial effects to most special status species adapted to fire in treated areas. In other areas, fire treatments would occur less frequently than in the historic fire regime, leading to further degradation of conditions. These altered conditions would create a greater risk of uncharacteristically severe wildland fire that would have the potential to adversely affect special status species.	**Special Status Species** An increase in areas restored with fire in Alternative 2 compared to Alternative 1 would benefit those special status populations that are enhanced by fire effects on vegetative mosaics and habitats. Over time, the risk of adverse effects to sensitive species from uncharacteristically severe fire would decrease in treated areas. With the scheduled nature of increased prescribed fire activities under Alternative 2, a greater ability to locate and avoid the disturbance of fire-sensitive special status populations, if necessary, exists. Individual plants and animals may be affected or displaced by fire events. Restoration would have no effect or beneficial effect on overall populations of special status populations.	**Special Status Species** *An increase in areas treated with fire in Alternative 3 compared to Alternative 1 would benefit those special status populations that are enhanced by fire. In some areas, conditions altered by fire exclusion could lead to uncharacteristically severe wildland fire effects that might have an adverse effect on special status species not adapted to more severe fire. However, over time, the risk of adverse effects to sensitive species from uncharacteristically severe fire would decrease in treated areas. Due to the random nature of wildland fire use ignitions, sensitive populations might be impacted by fire before they could be located and protection efforts, if needed, would be more difficult. Species that are fire dependent would benefit from the occurrence of fire in a more ecologically-desirable natural pattern of wildland fire use leading to natural vegetation mosaics.* Individual plants and animals may be affected or displaced by fire events. Restoration would have no effect or beneficial effect on overall populations of special status populations.	**Special Status Species** An increase in areas treated with fire compared to Alternative 1 would benefit those populations that are enhanced by fire. The risk of adverse effects to special status species from uncharacteristically severe fire would decrease in treated areas. In areas where prescribed fire is used, species that are sensitive to fire could be located and protected if necessary. With increased wildland fire use in Alternative 4, and due to the random nature of these ignitions, sensitive populations might be impacted by fire before they could be located and protection efforts, if needed, would be more difficult to implement. More natural ignition and spread patterns would result from wildland fire use, benefiting species that are adapted to the creation of these vegetative mosaics. Individual plants and animals may be affected or displaced by fire events. Restoration would have no effect or beneficial effect on overall populations of special status populations.

Alternative 1 No Action (Current Program)	Alternative 2 Prescribed Fire	Alternative 3 Wildland Fire Use	Alternative 4 Multi-Strategy (Preferred Alternative)
Non-Native/Invasive Species With only some areas of the parks treated with fire under the current program, the potential for uncharacteristically severe wildland fire is greater, providing more opportunity for non-native/invasive species that respond positively to severe fire disturbance.	**Non-Native/Invasive Species** *An increase in areas restored with fire in this alternative compared to Alternative 1 would increase the potential for establishment and spread of non-native species promoted by fire disturbance, but limit the areas disturbed by severe wildland fire.*	**Non-Native/Invasive Species** *An increase in areas treated with fire under this alternative compared to Alternative 1 would increase the potential for establishment of non-native/invasive species that are enhanced by fire, but limit the areas disturbed by severe wildland fire.*	**Non-Native/Invasive Species** An increase in areas restored with fire in Alternative 4 compared to Alternative 1 would increase the potential for non-native/invasive populations that are enhanced by fire, but limit the areas disturbed by severe wildland fire.
Air Common to All: All individual wildland fire use and prescribed fire projects will be managed under the same conditions and constraints under all alternatives. Each project will be implemented only with the concurrence of the San Joaquin Valley Air Pollution Control District, and managed to maintain smoke emissions in communities below the legal thresholds as defined by the State of California and the Environmental Protection Agency.			

Alternative 1 No Action (Current Program)	Alternative 2 Prescribed Fire	Alternative 3 Wildland Fire Use	Alternative 4 Multi-Strategy (Preferred Alternative)
Air Under Alternative 1, PM-10 emissions would not significantly change in the short term. Modest levels of proactive fuels management with the opportunity to adjust timing would decrease smoke events in some areas of the parks over time. Occasional large unwanted fire events would continue to affect local communities and regional air quality several times each decade. Over the long-term fuels would accumulate in untreated areas of the parks resulting in larger, less predictable unwanted fire events.	**Air** A threefold increase in annual PM-10 emissions would occur compared to Alternative 1 in the first 10 years of implementation as the 100-year backlog of fuels was reduced. After 25 years of proactive fuels management, emissions would decrease compared to the 10-year average. Due to the exclusive use of prescribed fire in this alternative and the subsequent ability to select the timing and location of most fire events, the impacts of prescribed fire smoke events could be minimized. The duration and intensity of smoke from large unwanted fire events would decrease over time as heavy fuel concentrations were systematically reduced across the parks.	**Air** Annual PM-10 emissions would be 3.5 times the current program outputs (represented by Alternative 1) during the first 10 years of implementation. After 25 years of proactive fuels management, emissions would decrease compared to the 10-year average. Some large unwanted fire events would occur each decade, with declining duration and intensity of associated smoke events over time as fuels are proactively managed and fuel loads are reduced across the parks. Due to the exclusive use of random natural events under this alternative, less control over the timing and placement of fire events would result in less opportunity to manage smoke impacts compared to all other alternatives.	**Air** Annual PM-10 emissions would be 2.3 times the current program outputs compared to Alternative 1 during the first 10 years of implementation. After 25 years of proactive fuels management, emissions would rapidly decrease to near the current program levels. The use of natural fire in this alternative reduces the ability to manage smoke events in comparison to Alternative 2, but with the proactive management of prescribed fire, better control is effected over Alternative 3. Some large unwanted fire events would occur each decade, with declining duration and intensity of associated smoke events over time as fuels are proactively managed and fuel loads are reduced across the parks.

Alternative 1 No Action (Current Program)	Alternative 2 Prescribed Fire	Alternative 3 Wildland Fire Use	Alternative 4 Multi-Strategy (Preferred Alternative)
Water Temporary effects on water quality on a localized basis may occur. Only moderate increases in run-off yield due to the reduction of vegetation would result from prescribed burns because managers could control the location, timing, and severity of fire. There is a continuing backlog and accumulation of fuels with associated impacts of water resources and potential risk (moderate-to-high) of catastrophic fire events. Such events may be extreme with severe fire behavior over large areas, which would result in adverse impacts to various water properties. The risk does not decline significantly over time due to continuing fuel accumulations.	**Water** A moderate increase in run-off yield over alternative 1 would be expected under this alternative due to the reduction of vegetation produced by prescribed burns. This alternative provides for the maximum control of fire– season, size, severity, and location. Initially there would be some potential for adverse unplanned fire events in unnatural fuels, similar to Alternative 1, but the risk of such occurrences would decline over time. Significant long-term impacts on water could occur through such activities as extensive fireline construction necessary to control prescribed burns. Since these activities would be required in all portions of the parks under this alternative, there would be more widespread impacts. Because prescribed fires would be used, which would be ignited under specific prescriptions, there is the potential that the full range of natural processes that acted on water in the past would not be restored.	**Water** Outcomes of fire and its impact on park water resources would be less predictable under this alternative. The unpredictability may result in either desirable or undesirable impacts for water depending on location, size, and intensity of burns. The effects would be more positive to the extent that the unplanned fires occur under the normal range of fuel and fire behavior conditions. Fires outside this range could potentially result in detrimental impacts with unnatural impacts on water resources and sedimentation. Such fires would have the greatest chance of occurring where unnatural fuels and vegetation currently occur. The potential effects would probably be most pronounced in the Kings and Kaweah watersheds. Impacts related to line construction and similar activities would be minimized relative to the other alternatives.	**Water** The initial impacts of this alternative are similar to those for Alternative 2 due to the dominance of prescribed burning. As forest conditions and fuels are restored prescribed burning would decline and natural fire would play an increasingly important role. Impacts of natural fire would be minimal because they would generally be confined to areas where unnatural fuel levels have been restored by prescribed burning or to areas where forest conditions and fuels have remained within the range of pre-Euroamerican settlement conditions. Impacts from implementing prescribed burns (line construction etc.) would be greatest at the onset of this alternative and decline over time. The amount of park area where natural variation in fire effects on water resources could occur would increase over time.

Alternative 1 No Action (Current Program)	Alternative 2 Prescribed Fire	Alternative 3 Wildland Fire Use	Alternative 4 Multi-Strategy (Preferred Alternative)
Soil Because of the ability to control location, timing, and severity of some fires in this alternative, there would be moderate effects on soils. There is a continuing backlog and accumulation of fuels with associated impacts of soils and potential risk (moderate-to-high) of catastrophic fire events. Such events could be extreme, with severe fire behavior over large areas resulting in adverse impacts to various soil properties. These impacts may be most severe in chaparral vegetation. The risk does not decline significantly over time due to continuing fuel accumulations.	**Soil** Compared to all the alternatives, Alternative 2 provides for the maximum control of fire (season, size, severity, and location). Initially there would be potential for adverse fire events in unnatural fuels, similar to Alternative 1, but the risk of occurrence would decline over time as the amount of area restored is increased and fuel continuity is broken up. Significant long-term impacts on soils could occur through such activities as fireline construction necessary to control prescribed burns. Since these activities would be required in all portions of the parks under this alternative, the impacts would be widespread. Because prescribed fires would be used, which would be ignited under specific prescriptions, there is the potential that the full range of natural processes that acted on soils in the past would not be restored.	**Soil** Outcomes of fire and its impacts on park soil resources would be more unpredictable under this alternative. This alternative provides the least control over such factors as size, severity, season, and location of fires. The unpredictability or variation in fire events that result may have either desirable or undesirable impacts for soils, depending on location, size, and intensity of burns. Effects would be more positive to the extent that the unplanned fires occur under the normal range of fuel and fire behavior conditions. However, fires outside the range could result in detrimental impacts with unnatural rates of soil erosion and run-off. Such fires would have the greatest chance of occurring where unnatural fuels and vegetation currently occur. The potential effects would probably be most pronounced in the Kings and Kaweah watersheds. Impacts related to line construction and similar activities would be minimized relative to the other alternatives.	**Soil** The initial impacts of this alternative are similar to those for Alternative 2 due to the dominance of prescribed burning. As forest conditions and fuels are restored, prescribed burning would decline and unplanned fire would play an increasingly important role. Impacts of natural fire would be minimal because they would generally be confined to areas where unnatural fuel levels have been restored by prescribed burning or to areas where forest conditions and fuels have remained within the range of pre-Euroamerican settlement conditions. Impacts from carrying out prescribed burns (line construction etc.) would be greatest at the onset of this alternative and decline over time. Amount of area where natural variation in fire effects on soils occurred would increase over time.

Alternative 1 No Action (Current Program)	Alternative 2 Prescribed Fire	Alternative 3 Wildland Fire Use	Alternative 4 Multi-Strategy (Preferred Alternative)
Health/Safety Common to All: Implementation of the parks' *Smoke Management Plan* would minimize exposure of visitors, employees, and local communities to unhealthful exceedances of air quality standards. Some individuals exposed to smoke may be sensitive or susceptible to smoke impacts at levels below the legal limits. Under all alternatives, the parks will manage this potential impact through a system of identification of sensitive individuals in the affected communities, advance notification to help affected parties mitigate or avoid potential impacts, and any other actions deemed reasonable by the Air District.			
Health/Safety Public. There is no expected increase in fire caused injuries to visitors, employees, and the public. Under Alternative 1, fire operations would remain at current levels with intermittent visitor, employee, and general public exposure to ground level smoke. Fire Personnel. Since fire operations would remain at current levels, there would not be an immediate increase in the rate of exposure of fire personnel to hazardous conditions—both fire and smoke. Over time, as fuels continue to accumulate in untreated areas of the parks and the risk of catastrophic fire grows, fire personnel would be exposed to increasingly hazardous conditions.	**Health/Safety** Public. There is no expected increase in fire-caused injuries to visitors, employees, and the public. A significant increase in prescribed fire operations would occur which has the potential to increase the exposure of visitors, employees, and the public to ground level smoke particularly during late night and morning periods when smoke plumes collapse, descend and concentrate in low lying areas or canyon bottoms. Fire Personnel. There would be a significant increase in the number and extent of prescribed fire operations that would cause an increase in the rate of exposure of fire personnel to hazardous conditions—both fire and smoke. An increase in injuries may occur but it is not possible to predict with any certainty the increased rate of injury. The planned nature of prescribed fire events should allow for a lower rate of injuries than Alternative 3 given its unplanned nature.	**Health/Safety** Public. There is no expected increase in fire-caused injuries to visitors, employees, and the public. A significant increase in wildland fire use operations would occur which has the potential to increase the exposure of visitors, employees, and communities to ground level smoke particularly during late night and morning periods when smoke plumes collapse, descend and concentrate in low lying areas or canyon bottoms. Fire Personnel. There would be a significant increase in the number and extent of wildland fire use operations that would cause an increase in the rate of exposure of fire personnel to hazardous conditions—both fire and smoke. This exposure would be unplanned with the potential of a higher rate of injury than Alternative 2.	**Health/Safety** Public. There is no expected increase in fire-caused injuries to visitors, employees, and the public. A significant increase in prescribed fire and wildland fire use operations would occur which has the potential to increase the exposure of visitors, employees, and general public to ground level smoke particularly during late night and morning periods when smoke plumes collapse, descend, and concentrate in low lying areas or canyon bottoms. Fire Personnel. There would be a significant increase in the number and extent of prescribed fire and wildland fire use operations which would cause an increase in the rate of exposure of fire personnel to hazardous conditions—both fire and smoke.

Alternative 1 No Action (Current Program)	Alternative 2 Prescribed Fire	Alternative 3 Wildland Fire Use	Alternative 4 Multi-Strategy (Preferred Alternative)
Community Economics Common to All: The fire program provides a net benefit to local business through an infusion of funds from payroll and operations.			
Community Economics Under Alternative 1, payroll costs for employees in the parks' fire management program under this alternative would be slightly over $1 million annually. Total additional dollars for program support and proactive fuels management would be $280 thousand annually. Offsetting the local economic benefits from fire payroll and support spending are expected periodic negative effects for the tourism industry as fire projects are implemented and fire suppression occurs resulting in road or facility closure. Impacts resulting from unplanned fires requiring suppression are expected to increase as suppression acres increase.	**Community Economics** Payroll size would increase through the addition of another operations crew. Payroll would increase to $1.2 million annually. Total support dollars available under the prescribed fire alternative would increase to about $300 thousand annually. Expected negative effects for the tourism industry would be greater initially than for Alternative 1, but decrease over time as fuels treatment leads to a reduction in fuels across the park. Negative effects could be partially mitigated through proper planning for prescribed fire events, reducing their randomness and subsequent impact upon the community.	**Community Economics** Payroll size would increase with the addition of one operations crew. Total payroll and total support dollars available would be the same as Alternative 2. A slightly higher level of negative impacts on tourism would be expected due to the random nature of the natural ignitions. Unplanned ignitions managed for resource benefit during the fire season without prior restoration of natural fuel loads could lead to more smoke production during the tourist season. Mitigation strategies would be more limited than with prescribed fire treatment (Alternative 2) or combined strategies (Alternatives 1 and 4).	**Community Economics** Payroll size would increase by roughly one-third with the addition of operations crews and support staff. Total payroll would increase to $1.5 million annually while total support dollars available would increase to $320 thousand. The budget for this program would be the highest of all alternatives, resulting in more economic benefit to local economies from that source. Anticipated negative effects on tourism would parallel the no action alternative. There would be a potential for an initial increase in impacts as treatment activity increased, but long-term effects from individual events would be reduced over time as fuels were restored to more natural levels.
Program Cost Park fire program costs would not change appreciably over current levels for implementation and monitoring. This alternative would have the lowest total cost and highest cost/acre of all alternatives.	**Program Cost** Annual operating costs for the park would increase to provide expanded staff to implement and monitor projects. This alternative would have the second lowest total cost and the lowest cost/acre of all alternatives.	**Program Cost** Annual operating costs for the park would increase to provide expanded staff to implement and monitor projects. This alternative would have the highest total cost and the second highest cost/acre of all alternatives.	**Program Cost** Park fire program costs would increase over past levels to provide proper management of the expanded efforts. This alternative would have the second highest total cost and the second lowest cost/acre of all alternatives.

Alternative 1 No Action (Current Program)	Alternative 2 Prescribed Fire	Alternative 3 Wildland Fire Use	Alternative 4 Multi-Strategy (Preferred Alternative)
Wilderness Under this alternative, the wilderness would appear natural to most visitors. However unnatural levels of fuels would continue to accumulate throughout much of the lower and mid-elevation wilderness. Tree density and species composition would continue to change away from natural conditions. Unnaturally intense fires may occur over larger portions of the wilderness as a result of increasing fuel and tree density. Some transient impacts would occur as a result of fire operations including helicopter use, fire camps, pack stock, motorized saws and pumps, and the presence of fire management personnel.	**Wilderness** This alternative would use prescribed fire to mimic natural process, and most unplanned ignitions would be suppressed. The result would be a reduction or elimination of unplanned fire events and their effects resulting in an environment primarily shaped by humans. Though the wilderness would appear "natural" or "wild" to most visitors, it would in fact be primarily a product of human intervention. More extensive use of firelines would be expected under this alternative than others, resulting in more visible and persistent evidence of human intervention. More activity related to management (necessary to simulate natural process) would result in increased levels of staff and equipment throughout the wilderness resulting in transient impacts.	**Wilderness** This alternative would allow the freest expression of natural processes in wilderness. However in areas that have been significantly altered by past suppression and have unnaturally high fuel loads and/or tree density, the effects of an unplanned fire may result in unnaturally intense or extensive fire. Most management activity would take the form of monitoring fire events by aircraft and on the ground. There would be an occasional need to initiate suppression actions to keep fires from directly impacting developments or other sensitive areas.	**Wilderness** This alternative would initially use extensive fireline construction to implement prescribed fire in areas where unnaturally high fuel loads and/or tree densities are present. In all other areas, the natural role of fire would be perpetuated and only constrained as required to protect structures, protect people, or conform to air quality regulations. Over time, impacts from fireline construction and suppression actions in wilderness would decrease.

Alternative 1 No Action (Current Program)	Alternative 2 Prescribed Fire	Alternative 3 Wildland Fire Use	Alternative 4 Multi-Strategy (Preferred Alternative)
Wild and Scenic Rivers This alternative would maintain or restore moderate amounts of wild and scenic river corridor, with emphasis on the segment flowing through the Cedar Grove developed area. Other areas of the wild and scenic river corridor not receiving treatment would be subject to greater unnatural change from high intensity wildfire events.	**Wild and Scenic Rivers** Most areas along the wild and scenic river corridors would receive proactive fuels management and would be protected from damaging large-scale high intensity fire events. Some degree of naturalness would be lost as a result of the deterministic implementation of prescribed fire projects throughout the river corridor.	**Wild and Scenic Rivers** Some areas along the wild and scenic river corridors would be protected from damaging large-scale high intensity fire events. Some risk from damaging large-scale high intensity fire events would remain as most areas would not receive conservative fuels reduction (either through mechanical treatment or prescribed fire) prior to burning in unplanned fire events.	**Wild and Scenic Rivers** Most areas along the wild and scenic river corridors would receive proactive fuels management and would be protected from damaging large-scale high intensity fire events. Areas would appear natural with minimal human intervention in wilderness areas.
Recreation Common to All: Depending on location and time of year, fire operations may cause temporary impacts to individual recreational experiences.			

Alternative 1 No Action (Current Program)	Alternative 2 Prescribed Fire	Alternative 3 Wildland Fire Use	Alternative 4 Multi-Strategy (Preferred Alternative)
Recreation Impacts include: 1) noise from aircraft and other power equipment such as chainsaws and portable pumps, and 2) temporary closures of roads, trails, or facilities to protect visitors from direct exposure to fire events. Smoke from fires may occasionally restrict visibility and impact viewsheds, or become heavy enough to become a nuisance. The health impacts to visitors would be slight due to the relatively short duration of the average visit and the ability to be both mobile and flexible enough in itinerary to avoid smoke exposure. Fire helps to shape and renew the vegetation and wildlife habitats that are integral parts of many recreational pursuits in the parks. Fire events may also create unique opportunities for visitor experiences and educational opportunities. The effects of some fires, such as facilitating the germination of giant sequoia seeds and stimulating wildflower displays, may provide positive experiences.	**Recreation** In the short term this alternative may result in slightly increased negative impacts to recreational use compared to Alternative 1 due to more aggressive implementation of a prescribed fire program. Impacts would take the form of occasional closures of roads or wilderness areas to implement fire operations. This alternative would have fewer negative impacts on recreational use than Alternative 3 due to more rigid control over timing and placement of ignitions. Over the long term, random and aggressive suppression actions would be reduced as more of parklands were restored to natural fuel loads and forest density, reducing the duration and number of closures and smoke events.	**Recreation** Many impacts are similar to Alternative 2. However this alternative may result in additional impacts to recreational use compared to other Alternatives due to the random nature of ignitions and lack of proactive fuels management.	**Recreation** Same as Alternative 2 except that there would be less evidence of fire management activities in wilderness and backcountry areas due to management of unplanned ignitions in place of more operations-intensive prescribed fire projects.

Alternative 1 No Action (Current Program)	Alternative 2 Prescribed Fire	Alternative 3 Wildland Fire Use	Alternative 4 Multi-Strategy (Preferred Alternative)
Cultural/Historic This alternative uses a combination of mechanical fuel removal, suppression, and management of planned and unplanned ignitions to achieve modest accomplishments. Prescribed burns and mechanical treatments would be pre-planned allowing avoidance and mitigation of most cultural resource impacts. Protection of cultural resources would be considered when implementing fire use projects. Since this alternative does not treat all areas of the park with prescribed fire or mechanical fuel removal at a level sufficient to offset increasing accumulation of fuels, high intensity fire events leading to cultural resource damage would be expected on occasion.	**Cultural/Historic** A focus on the use of pre-planned prescribed fire as the dominant management strategy in this alternative allows the best opportunity for advance clearance and avoidance of cultural resource impacts. However, since this alternative depends exclusively on the use of prescribed fire requiring extensive fireline construction throughout the park, it has a fairly high probability of disturbing currently unidentified cultural resources. This alternative would treat heavy fuel accumulation parkwide, decreasing the risk of damage to cultural resources from intense fire events. Occasional emergency suppression actions needed to control unwanted fires may result in negative effects. With continued application of prescribed fire, fuels loads and resulting high intensity events would diminish with time and reduce the potential for damage.	**Cultural/Historic** This alternative optimizes the use of random fire ignitions and minimizes the use of pre-planned actions. As such, it provides the least opportunity for advance clearance and mitigation of fire effects on cultural resources. Since much less fireline would be constructed under this alternative, concerns for sub-surface disturbance of cultural resources would be reduced. However, the lack of preplanning combined with the occasional large high intensity event would place above ground prehistoric and historic sites/structures/objects at highest risk. This alternative is the least amenable for overall protection of cultural resources given the current fuel loads.	**Cultural/Historic** The adoption of a multi-strategy program may result in a variety of potential impacts to known cultural resources similar to the impacts outlined above for Alternative 1. However, the degree of these potential impacts would be greater given that more acres would be targeted for treatment per year. With the use of prescribed fire and mechanical fuel reduction, the ability to pre-plan mitigation actions would reduce the potential impacts to cultural resources. Pro-active fuels management would also reduce the risk of catastrophic wildland fire and associated emergency responses. These planned treatments have the potential to increase surface disturbances through the construction of firelines that may result in adverse impacts to shallowly buried sites/structures/objects. The use of wildland fire use and suppression would be closely coordinated with the parks' cultural resources specialist given the potential for ground disturbance and attendant site impacts (the emergency placement of fire camps, firelines, and staging areas).

Alternative 1 No Action (Current Program)	Alternative 2 Prescribed Fire	Alternative 3 Wildland Fire Use	Alternative 4 Multi-Strategy (Preferred Alternative)
Risk of Catastrophic Events Continuation of the current program would provide a modest amount of protection from catastrophic fire in limited areas of the parks. High priority would be given to the protection of developments and boundary areas. Less emphasis would be placed on managing the risk of catastrophic fire for the benefit of natural or cultural resources.	**Risk of Catastrophic Events** This alternative would reduce the threat of catastrophic fire across most of the susceptible parklands to a much greater degree than Alternative 1. The dominant use of prescribed fire along with some limited mechanical fuel reduction around developments optimizes the controllability of fuel reduction and forest density operations, and minimizes the opportunity for random natural variables (wind, lightning, etc.) to affect outcomes.	**Risk of Catastrophic Events** Managing unplanned fires without first reducing fuels or density through more conservative means (mechanical fuel reduction or prescribed fire) may result in an increased risk of catastrophic fire events. Under this alternative, developments would receive some mechanical treatment to minimize risk of catastrophic events, but natural and cultural resources outside of these developed areas would remain at risk.	**Risk of Catastrophic Events** The effects of this alternative would be similar to Alternative 1, though a much larger portion of the susceptible areas in the parks would be treated, further reducing risk.
Environmental Justice No effect.	**Environmental Justice** No effect.	**Environmental Justice** No effect.	**Environmental Justice** No effect.
Indian Trust Resources No effect.	**Indian Trust Resources** No effect.	**Indian Trust Resources** No effect.	**Indian Trust Resources** No effect.

MITIGATION

Following are the mitigation measures that would be implemented under the preferred alternative, Alternative 4 – Multi Strategy. These mitigation measures would prevent significant impact, impairment of park resources, violation of applicable laws and policies, and address public concerns. The issues and potential impacts are discussed at greater length in the related sections in Chapter 5.

Table 6-3 – Mitigation Matrix

Issue	Potential Impact	Mitigation Actions	Responsibility
Vegetation	Unnatural damage from high intensity fire events.	Use conservative prescriptions to reduce unnatural fuel loads and stem density in areas needing restoration. Monitor outcomes of planned fire and mechanical fuels projects.	Fire management office Fire effects program manager.
	Direct damage to trees and other vegetation while implementing fire management operations.	Apply minimum impact suppression techniques (MIST) to all fire management actions.	All fire operations.
Wildlife	Unnatural change in habitat induced by high intensity fire events.	Use conservative prescriptions to reduce unnatural fuel loads and stem density in areas needing restoration. Monitor outcomes on selected species.	Fire management office Fire effects program manager.
Special Status Species	Federally listed – Threatened valley elderberry longhorn beetle (*desmocerus californicus dimorphus)*	Restrict planned ignitions to between June 15 – February 28 in habitat below 3,000' elevation per USFWS recommendation of June 21, 1995 (Chapter 7).	Fire management office
	Other non-listed species of concern.	Monitor species recommended in Chapter 5.	Fire Effects program manager and park plant ecologist.
Prevent Spread of Non-Native Invasive Species	Introduction of aggressive non-native species.	Use MIST on all actions to minimize soil disturbance. Use appropriate burned area emergency rehabilitation (BAER) strategies and techniques to stabilize sites, monitor for invasives, and implement control measures as necessary following wildfire events. Monitor populations of known exotics of concern to	All fire operations Fire Planner and BAER teams as appropriate. Fire effects program manager and exotic

Issue	Potential Impact	Mitigation Actions	Responsibility
		determine trends. Support research into prevention and mitigation strategies to prevent introduction and spread of aggressive non-natives following fire.	plant program manager. Fire management and natural resource offices.
Air Quality	Smoke and particulate matter.	Consult with and obtain burn permits from the San Joaquin Valley Air Pollution Control District (SJVAPCD) when implementing any wildland fire use or prescribed burn project. Implement Best Available Control Measures (BACM) to conform with the SJVAPCD *Implementation Plan for PM-10*. Implement the *Smoke Management Plan* (SMP) contained in the *Fire and Fuels Management Plan*. The SMP implements BACM and contains detailed commitments for smoke modeling, monitoring, public notification, and regulatory oversight by the (SJVAPCD). As part of the *Smoke Management Plan*, monitor smoke in sensitive areas and adjust prescribed fire project accomplishments and progress as needed to maintain air quality within published health standards. Maximize the benefits of pre-planning and planned ignitions to the extent compatible with land management objectives to burn during the best possible dispersal periods. Work proactively with the SJVAPCD and other land managers to continue development of models, strategies, technologies, and best management practices to achieve further reductions in emissions.	Fire management officer, and fire monitoring/smoke management program manager. Fire management officer and all burn bosses. Fire management officer, burn bosses, fire monitors, smoke and weather technician, fire behavior specialist. Fire monitors, smoke and weather technician. Fire management office, fire behavior specialist, burn bosses. San Joaquin Valley Unified Air Pollution Control District staff.

Issue	Potential Impact	Mitigation Actions	Responsibility
Water	Contamination of waterways from firefighting retardant or foam.	Apply restrictions on the application of retardant and foams in or adjacent to waterways as contained in the *Fire and Aviation Management Operations Guide* (FAMOG).	Fire management office.
	Minimize unnatural levels of sedimentation in waterways.	Use conservative prescriptions to reduce unnatural fuel loads and stem density in areas needing restoration. Monitor outcomes of planned fire and mechanical fuels projects on water resources. Use appropriate burned area emergency rehabilitation (BAER) strategies and techniques to stabilize soils and implement control measures as necessary following unnaturally intense or extensive fire events. Use MIST strategies to rehabilitate firelines and other disturbances within the same season to the extent fire control objectives are not compromised, or no later than the next fire season.	Fire management office, all operations personnel. Fire effects program manager and aquatic ecologist. Fire planner and BAER team as appropriate. All fire operations.
Soil	Minimize unnatural rates of soil erosion	Use conservative prescriptions to reduce unnatural fuel loads and stem density in areas needing restoration. Individual project size would be within the range of natural variability. Use appropriate burned area emergency rehabilitation (BAER) strategies and techniques to stabilize soils and implement control measures as necessary following wildfire events. Use MIST strategies to rehabilitate firelines and other disturbances within the same season to the extent fire control is not compromised.	All fire operations. All fire operations. All fire operations.

Issue	Potential Impact	Mitigation Actions	Responsibility
Health/Safety	Visitor, community, and park resident health & safety.	Make firefighter and public safety the highest priority during all fire management actions. Implement local closures or restrictions as needed to prevent direct injury from fire. Implement road visibility standards contained in the FAMOG. Implement BACM for smoke management and monitoring as specified in the Smoke Management Plan.	Superintendent, Fire management office, all fire personnel. Fire management office in consultation with Supernatant. Burn boss. Burn boss, fire management office, fire monitors, smoke and weather technician.
	Firefighter health & safety.	Follow all guidelines regarding firefighter safety as specified by the National Wildland Coordinating Group, including mandatory safety training, consistent use of personal protective equipment, adherence to standard firefighting orders, and other guidance. Make firefighter and public safety the highest priority during all fire management actions.	All fire operations staff. All staff.
Community Economics	Potential loss of tourism and community revenue during suppression actions and related closures.	Encourage local purchase of lodging, supplies, and materials by suppression forces during emergency actions. Provide accurate public information regarding closures and impacts. Minimize the time and extent of closures and other restrictions consistent with firefighter and public safety.	Fire management office. Fire information officer. Fire management office.
Program Cost	Program cost.	Consistently assess program costs in relation to program objectives. Request routine fiscal audits by the National Interagency Fire Center. Apply recommendations from audits.	Fire management office, National Interagency Fire Center Fire management officer.

Issue	Potential Impact	Mitigation Actions	Responsibility
Wilderness	Use of minimum tool	As listed in the EA, certain mechanical, stock, and electronic devices would be considered as the minimum tool to achieve management, resource, and safety objectives. Timing, duration, and location of the use of various tools will take into account preservation of wilderness values.	All staff. Fire management office.
	Closures	Minimize the time and extent of trail and facility closures and other restrictions consistent with firefighter and public safety.	Fire management office.
	Effect on natural appearance of wilderness areas.	Apply MIST firefighting techniques to all operations. Rehabilitate all firelines, camps, and other operational areas to natural appearance using MIST and BAER standards within the same season if consistent with fire control objectives, or as soon as practical in the subsequent season.	Burn boss and all fire operations. All fire operations staff.
	User conflicts	Timing of operations will fully consider opportunities to minimize noise, closures, placement of fire camps, and other temporary intrusions into the wilderness that may affect visitor use. Travel routes for helicopters and packstock used to support fire operations will be planned to minimize impacts on visitor use and enjoyment of the wilderness. Pack stock, where used, will conform to existing regulations regarding party size and grazing restrictions. Where opportunity exists, popular visitor destinations and forage areas will be avoided when grazing stock or establishing fire camps or other facilities.	Fire management office. Fire management office. Fire management office and stock use/meadow monitoring program manager.
Wild & Scenic Rivers	River character	No fire related permanent facilities or crossings will be built in any designated river corridors. Fire management objectives in these areas will be to restore and maintain natural conditions.	Fire management office.

Issue	Potential Impact	Mitigation Actions	Responsibility
		See also "Water" above for related mitigations.	
Recreation	Closures	Minimize the time and extent of closures and other restrictions consistent with firefighter and public safety.	Fire management office.
	Aesthetic impacts	Minimize the effects of fire on featured giant sequoia trees, stumps, and logs of social importance (See *Fire and Fuels Management Plan*, Chapter 5 for listing of protected specimens and features and prescribed procedures).	Project burn boss.
Cultural/Historic Resources	Fire damage to resources.	Implement pro-active fuels management to minimize high intensity fire events. Incorporate cultural resources staff into pre-planning for prescribed fire and mechanical fuel removal projects to identify, avoid, and protect significant resources. For all non-emergency line construction, have cultural resources staff inspect and approve line corridor prior to any work. Avoid and/or protect significant resources in line construction area and within project area as directed by cultural resources staff. For emergency line construction, consult with cultural resources staff and avoid, protect, or otherwise mitigate potential damage consistent with firefighter and public safety. Monitor fire effects on known resources post-burn.	Fire management office. Fire management office, park archeologist. Burn boss, fire management office, park archeologist. Incident commander, fire management office, park archeologist. Park archeologist.
Reduce Risk of Catastrophic Events	Unnaturally intense and/or extensive fire events.	Implement pro-active fuels management to minimize high intensity extensive fire events. Use conservative prescriptions to reduce unnatural fuel loads and stem density in areas needing restoration.	Fire management office. Fire management office.